radiant at 52° + 57°. On August 14, between 10h. and 13h., 25 meteors were noted, but there were only two Perseids amongst them.

On August 8, Mr. Booth, at Leeds, watched the eastern sky for 4½ hours, and saw 45 meteors, including 25 Perseids. The radiant was at about 42° + 57½°, and it will be observed that the proportion of Perseids to the total number of meteors observed was the same as noted at Bristol on that date. On August 13, Mr. Booth recorded 13 Perseids from a radiant at 51½° + 56°, thus confirming the displacement observed at Bristol.

On August 10, Mr. G. T. Davis, of Theale, near Reading, reports the sky was clear and many meteors were visible between 9.30 and 11 p.m., the majority being Perseids. The same observer recorded a number of paths on August 5 and 8, and a comparison of his results with similar observations at Bristol show that 7 meteors were doubly observed at the two stations. Their heights, &c., were computed by the writer as follows :—

Date.	Hour.	Mag.	Height at appearance	Height at disappearance	Length of real path.	Radiant point.	Inclination to horizon.
1888.	G.M.T.						
Aug.	h. m.		Miles.	Miles.	Miles.	° °	°
5	10 19	1-3	69	50	37	50 + 55	27½
5	10 30	3-4	69	48	38	39 + 57	34
5	10 42	3-4	68	48	24	43 + 51	29
8	10 6	3-5	70	59	28	66 + 56	23
8	10 10	3-4	65	52	38	319 − 13	20
8	10 21	3-3	43	28	26	40 + 60	35½
8	10 28	4-4	68	48	24	42 + 57	33½

The close agreement in the heights of these meteors (except in the case of No. 6 in the list, which was much nearer the earth's surface than usual) will be noticed. They were, with the exception of No. 6, which belonged to a radiant in Aquarius, all members of the August meteor system, though in several cases, notably that of No. 4, the path, as observed at Reading, was not exactly conformable to the radiant point of this shower.

The recent display has furnished us with a splendid fire-ball. It appeared on August 13 at 11h. 33m., and was seen by Mr. Booth at Leeds, by Mr. Monck at Dublin, by the writer at Bristol, and by several observers at Birmingham and other places. When near its disappearance the fire-ball acquired such brilliancy that it lit up the firmament like a vivid flash of lightning, and in the latter portion of its path there remained a comet-like streak which at Leeds and Birmingham continued visible for three minutes. The descriptions of this exceptionally fine meteor are in good agreement. It traversed a course above Yorkshire at normal heights ; its brilliant streak had a mean elevation of 53 miles and length of 18 miles. No detonation appears to have been heard. W. F. DENNING.

NOTES.

IT is proposed by the Organizing Committee of Section B that in the course of the approaching meeting of the British Association there shall be a discussion in that Section upon the subject of "Valency." Prof. Armstrong will open the debate, and it is hoped that several other eminent chemists will take part. In the immediate neighbourhood of Bath there are no industries specially interesting to chemists, but arrangements are in progress by which it is hoped that members will be admitted to some of the works in and about Bristol, which is only ten miles away.

THE autumnal meeting of the Iron and Steel Institute was opened in the University, Edinburgh, on Tuesday. A hearty reception was given to the members in the Senate Hall by the Lord Provost (Sir Thomas Clark), Sir William Muir (Principal of the University), Prof. Armstrong (the honorary secretary of the Reception Committee), and other dignitaries and officials of the University. The members having adjourned to the Examination Hall of the University to begin the business of the meeting, the President, Mr. Daniel Adamson, announced that Sir James Kitson had been nominated by the Council as the President for the next two years, and he hoped that that would meet with the approval of the members. The Institute had intended, he said, to go to America for their next autumnal gathering, but the visit had been postponed until 1890, as that was considered a more suitable time, especially as a kind invitation had been given them to visit Paris next year, when the Exhibition was on. They would thus have an opportunity of entertaining their American friends. Sir Lowthian Bell took the chair while a paper on a lever-testing machine, prepared by the President, was discussed. It described in detail a horizontal compound lever-testing machine. Mr. Wickslead (Leeds), Mr. G. C. Hemming (Yale and Towne Manufacturing Company, U.S.), Mr. Brown (of Brown Brothers, Leith), M. Gautier (Paris), Mr. Nursey (London), and Sir Lowthian Bell took part in the discussion. A paper on manganese steel, by Mr. R. C. Hadfield (Sheffield), proved specially interesting, as it formed a guide to the exhibits of this metal at the Glasgow Exhibition.

THE third International Congress of Inland Navigation was opened at Frankfort-on-the-Main on Monday. It began with a speech from the President, Herr von Bötticher, Minister of State, who greeted those present in the name of the German Emperor. The Congress is divided into three sections. The first studies the improvement of river navigability, the best kind of boat for river navigation, and the best means of propulsion for boats. The second section occupies itself with the economic advantages of ship canals penetrating into the interior from river mouths, their navigability, and keeping in good order. The third deals with the reform of the statistics of interior navigation, and with the relations between agriculture and navigation.

ON Monday a paper by Dr. Gamaleia, of Odessa, on the cure of cholera by inoculation, was read to the Paris Academy of Sciences by M. Pasteur. The following information on the subject is given by the Paris Correspondent of the *Times*. It appears that in 1886 Dr. Gamaleia came to Paris as delegate of the Odessa doctors, and studied the Pasteur method, with which he made himself thoroughly acquainted. On his return to Russia various institutions were founded under his care for the cure of hydrophobia, which have proved very valuable. Five years ago M. Pasteur endeavoured to discover a means of curing cholera by inoculation. At his request a mission was sent by the French Government to Alexandria while cholera prevailed there, to study the subject. Dr. Lhuiller, one of the mission, died of cholera, and M. Pasteur did not press the continuance of the investigations. The subject, however, was taken up by Dr. Gamaleia, who has discovered a method similar to that of M. Pasteur, by which it is believed cholera can be cured by the inoculation of the cholera virus. As yet experiments have only been made on animals, but no doubt is entertained that it will be possible to apply in a short time the same process to man. After reading the paper, M. Pasteur stated that Dr. Gamaleia had expressed his readiness to repeat the experiments at Paris in presence of a committee of the Academy of Sciences, and to try on himself the inoffensive and sufficient dose for human vaccination. He is ready to undertake a journey into countries where cholera prevails to prove the efficacy of his method. M. Pasteur added that he need scarcely say that he accepted with the greatest satisfaction the offer made by Dr. Gamaleia to conduct the experiments in his laboratory. The letter was referred to the committee, which has a prize of 100,000 francs in its hands for a cure for cholera, and it was arranged that the experiments should be postponed till November.

WE have already called attention (p. 359) to the address delivered by M. Janssen on July 23, at the French Academy of Sciences, on the late Jules Henri Debray. M. Debray was born at Amiens in 1827, and entered the Normal School in 1847. There he became the collaborator of the illustrious Sainte-Claire Deville, with whom his name will always be intimately associated. As M. Janssen said, it is by his researches on dissociation, in which he developed M. Deville's ideas, that M. Debray will be chiefly remembered. He succeeded M. Deville at the Paris Faculty of Sciences, and at the Normal School. M. Debray was also assayer to the "Garantie" of Paris, Vice-President of the Society for the Encouragement of National Industry, and a member of the Higher Council of Public Instruction and of the Consulting Committee of Arts and Manufactures. He was considered one of the most active and distinguished members of the Academy of Sciences. After a short illness he died on July 19.

WE regret to record the death of Mr. William H. Baily, Acting Palæontologist of the Geological Survey of Ireland. He was born at Bristol in 1819. In 1844, having held for some years an appointment in the Bristol Museum, Mr. Baily was attached by the late Sir Henry de la Beche to the Geological Survey of England. He acted first as a draughtsman, and afterwards as assistant naturalist under Edward Forbes and subsequently under Prof. Huxley. In 1857, Mr. Baily was transferred to the Irish branch of the Geological Survey as Palæontologist, and this office he held until his death. He was also Demonstrator in Palæontology to the Royal College of Science, Dublin. Mr. Baily often contributed to the Proceedings of the Royal Irish Academy, of the Linnean and Geological Societies of London, of the Royal Geological Society of Dublin, and of various kindred Societies in Europe and the United States. His most important work was his "Characteristic British Fossils," which was incomplete at the time of his death.

MR. SETH GREEN, whose death from paralysis of the brain is announced from New York, made a great reputation in connection with fish culture in the United States. He died at the age of seventy-one. Mr. Green was appointed in 1868 one of the Fish Commissioners of New York, and soon afterwards was made Superintendent of Fisheries in that State. He was decorated with two gold medals by the Société d'Acclimatation of Paris. Mr. Green was the author of "Trout Culture," 1870, and "Fish Hatching and Fish Catching," 1879.

NEUTRAL chloride of platinum has been obtained in fine permanent crystals of the composition $PtCl_4 . 4H_2O$ by M. Engel (*Bulletin de la Soc. Chim.*). The universally-employed chloride of platinum is, as is well known, in reality a chloroplatinate, $PtCl_4 . 2HCl . 6H_2O$; and the neutral chloride cannot be obtained from it by merely raising its temperature, which causes it to part with a portion of its chlorine in addition to the hydrochloric acid, leaving the lower chloride, $PtCl_2$. Some time ago, however, a neutral salt was prepared by Norton, who assigned to it the formula $PtCl_4 . 5H_2O$. Norton's method of preparation consisted in the addition of silver nitrate to the ordinary commercial chloride of platinum in the proportion of two molecules of the former to one of the latter. The composition of the precipitate appears never to have been thoroughly cleared up, but the filtered liquid was found to deposit crystals of the neutral chloride. As the whole subject appeared involved in a certain amount of doubt, Engel has repeated Norton's work, and finds that the neutral chloride *is* obtained under these conditions, but that the crystals contain only four molecules of water of crystallization. The reaction, moreover, is shown to proceed in the following manner:—

$$PtCl_4 . 2HCl + 2AgNO3 = 2AgCl + PtCl_4 + 2HNO_3.$$

The best mode of preparing the neutral chloride of platinum, according to Engel, consists in dissolving in a solution of the chloroplatinate the necessary quantity of oxide of platinum, prepared by Fremy's method, in order to neutralize the excess of hydrochloric acid. The filtered liquid, on evaporation, then deposits beautiful crystals of $PtCl_4 . 4H_2O$, permanent in the air, and not at all deliquescent like the chloroplatinate. The composition of these crystals was determined both by weighing the metallic platinum left on calcination of a known weight, and by estimation of the chlorine by fusion of the crystals with carbonate of potash and precipitation with silver nitrate. The water was, of course, given by difference. In spite of the stability of the chloroplatinate, it is a somewhat curious fact that the powdered crystals of the neutral chloride do not take up hydrochloric acid gas at ordinary temperatures. At about 50° C., however, the chloride partially liquefies under the influence of a dry current of the gas, forming the chloroplatinate. As might be expected from its non-deliquescence, the new chloride is very much less soluble in water than is the ordinary chloroplatinate.

THE Portuguese Government has given notice that from August 1 meteorological signals will be established at six semaphore stations along its coast, between the River Douro and Cape St. Vincent, and shown to passing vessels requiring information as to the state of the weather in the Bay of Biscay, at Gibraltar, and at Madeira. Each notice will indicate the time to which the information refers, the locality to which it has reference, and the direction and force of the wind, together with any other particulars which the Lisbon Observatory may consider it expedient to give. The signals will usually be made by flags, of the International Code of Signals, or by semaphore, when colours of flags would not be easily distinguished. This useful information is at present only to be obtained from very few countries.

IN the new number of the Journal of the Anthropological Institute there is an interesting note, by Mr. Basil Hall Chamberlain, on the Japanese "go-hei," or paper offerings to the Shinto gods. It has been thought by some European travellers that the Japanese, prompted by equal frugality and irreverence, offer paper to their gods because it is the cheapest article at hand. Mr. Chamberlain suggests a more reasonable explanation. Though paper is now used in the ceremonies of the Shinto religion, this was not so in days preceding the eighth century of the Christian era. The offerings then were made of two kinds of cloth—a white kind made of the paper-mulberry (*Broussonetia papyrifera*), and a blue kind made of hemp. Such cloth was the most precious article in the possession of a population to whom luxury and art were unknown. Later on, when Chinese civilization had brought a variety of manufactures in its train, hempen cloth ceased to be regarded as a treasure worthy of the divine acceptance; and, frugality perhaps helping, and partly also in accordance with that law of progress from the actual to the symbolical which characterizes all religions, paper began to be used instead. Mr. Chamberlain is unable to determine the date of the change, Shinto having suffered such an eclipse from the eighth to the seventeenth century that little regarding its mediæval history has been preserved. During all that time, Buddhism reigned supreme. Speaking of the general character of Shinto as a national religion, Mr. Chamberlain says that even native commentators, over anxious as they are to magnify everything Japanese at the expense of everything foreign, acknowledge that it has no moral system, no body of views of any kind save worship of the gods who were the ancestors of the Imperial House. For this reason Shinto collapsed utterly at the touch of Buddhism, and it fails to support itself now, when an attempt is being made to revive it for political purposes. It has nothing in it that appeals to the religious instincts of the people.

MESSRS. GEORGE PHILIP AND SON announce that they have made arrangements for the publication in December next of

“The Educational Annual,” a handy reference volume of about 200 crown octavo pages on educational subjects, which is likely to prove a convenience to school managers, teachers, and others interested in the promotion of national education. It is proposed to review elementary education, technical education, agricultural education, industrial, reformatory, truant, and ragged schools, secondary education, and, generally, the purpose and work of the Education Department, the Science and Art Department, the training of teachers, and the teachers' organizations.

Messrs. Sonnenschein and Co. will issue shortly a translation of Moritz Hauptmann's “Nature of Harmony and Metre.” The work consists of three parts. The first part considers the evolution of harmony from acoustics, taking as basis the Hegelian theory of sound. In the second part the author discusses metre and rhythm, which are respectively analogous to harmony and melody. The last part of the book is concerned with the union of metre and harmony—that is, harmony and melody in concrete combination with metre and rhythm.

A specimen of the golden mullet (*Mugil auratus*, Risso), 320 mm. in length, has been caught at Stromstad, on the south-west coast of Sweden. Only once before has a specimen of this fish been caught on the Swedish coast.

The authorities of the Mason Science College, Birmingham, have issued the syllabus of day classes to be held during the session 1888–89.

According to the *American Naturalist*, the proposed site of the National Zoological Park at Washington is one of great beauty, and even grandeur. It is in the valley of Rock Creek, just beyond the city limits, and at two points walls of rock rise to a height of over 80 feet. The Rock Creek will afford what the *American Naturalist* describes as “unrivalled facilities” for the care of aquatic mammals and birds of all kinds. Nearly the whole tract is covered by a fine growth of forest trees.

The additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus* ♀) from India, presented Mr. William Norman; a Lesser White-nosed Monkey (*Cercopithecus petaurista* ♂) from West Africa, presented by Mr. W. Blandford Griffith; a Tiger (*Felis tigris* ♂) from India, presented by Sir E. C. Buck, C.M.Z.S.; a Bengal Cat (*Felis bengalensis*) from India, presented by Mr. W. L. Sclater, F.Z.S.; a Black-backed Piping Crow (*Gymnorhina leuconota*), two Leadbeater's Cockatoos (*Cacatua leadbeateri*) from Australia, a Common Magpie (*Pica rustica*), four Common Herons (*Ardea cinerea*), British, two Himalayan Monauls (*Lophophorus impeyanus* ♂ ♂) from the Himalayas, two Gold Pheasants (*Thaumalea picta* ♂ ♀), two Silver Pheasants (*Euplocamus nycthemerus* ♂ ♀), two Mandarin Ducks (*Æx galericulata*) from China, a Javan Pea-fowl (*Pavo spicifer* ♂) from Java, two Common Pea-fowls (*Pavo cristatus* ♂ ♀) from India, a Rose-crested Cockatoo (*Cacatua moluccensis*) from Moluccas, a Hyacinthine Macaw (*Ara hyacinthina*), a Blue and Yellow Macaw (*Ara ararauna*) from South America, a Great Eagle Owl (*Bubo maximus*), European, presented by Mr. Charles Clifton, F.Z.S.; a Bare-eyed Cockatoo (*Cacatua gymnopis*) from North Australia, presented by Mrs. Fishlock; an Imperial Eagle (*Aquila imperalis*) from Morocco, presented by Mrs. Ernest H. Forwood; two American Box Tortoises (*Terrapene carinata*), two Alligator Terrapins (*Chelydra serpentina*), a Speckled Terrapin (*Clemmys guttata*), four Sculptured Terrapins (*Clemmys insculpta*) from North America, presented by Prof. O. C. Marsh, C.M.Z.S.; a Horned Lizard (*Phrynosoma cornutum*) from North America, presented by Master Howard Sexton; six Guinea Pigs (*Cavia porcellus*, var.), presented by Mr. R. F. Bennett; a Common Kingfisher (*Alcedo ispida*), British, deposited; a New Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*) from New Zealand, purchased; two Chinchillas (*Chinchilla lanigera*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Comet 1888 *c* (Brooks).—Dr. H. Kreutz (*Astr. Nachr.*, No. 2853) has computed the following elements and ephemeris for this comet from observations made at Vienna on August 9, and at Strassburg on August 10 and 11. The middle place was represented closely.

$$T = 1888 \text{ July } 16\cdot1982, \text{ Berlin M.T.}$$

$$\left.\begin{aligned} \omega &= 34^\circ\ 36'\cdot90 \\ \Omega &= 94\ \ 59\cdot69 \\ \iota &= 71\ \ 25\cdot07 \end{aligned}\right\} \text{Mean Eq. } 1888\cdot0.$$

$$\log q = 9\cdot92444$$

$$\begin{aligned} x &= [9\cdot51743]\ r\ .\ \sin\,(v + 229^\circ\ 57'\cdot12) \\ y &= [9\cdot99943]\ r\ .\ \sin\,(v + 148\ \ 23\cdot72) \\ z &= [9\cdot97573]\ r\ .\ \sin\,(v + \ \ 59\ \ 24\cdot32) \end{aligned}$$

Ephemeris for Berlin Midnight.

1888.	R.A. h. m. s.	Decl. ° ′	Log *r*.	Log Δ.	Brightness.
Aug. 23	12 5 53	42 14·0 N.	0·0390	0·2201	0·74
25	12 19 20	41 26·1			
27	12 32 20	40 33·4	0·0568	0·2254	0·67
29	12 44 50	39 36·5			
31	12 56 49	38 36·1	0·0746	0·2326	0·60
Sept. 2	13 8 17	37 32·8			
4	13 19 16	36 27·2	0·0921	0·2413	0·53
6	13 29 45	35 19·9			
8	13 39 46	34 11·3 N.	0·1094	0·2514	0·47

The brightness on August 9 is taken as unity.

Yale College Observatory.—The Reports of this Observatory for the last two years have recently been published. That for the year 1886–87 notes the retirement of Mr. Orray T. Sherman, who had charge of the Thermometric Bureau up to the date of his resignation in November 1886, and the renewal of subscriptions for the support of the work with the heliometer for another period of three years. Prof. Loomis had borne the expense of printing and distributing Dr. Elkin's memoir upon the Pleiades, and a second grant of 600 dollars had been made from the Bache Fund to enable Mr. Asaph Hall, Jun., the Assistant Astronomer at the Observatory, to carry on his observations of Titan for the determination of the mass of Saturn. Dr. Elkin had continued his heliometer measures for the determination of the mean parallax of the first magnitude stars; and the Report for 1887–88 records the completion of this work, and gives the results for the ten stars observed. These are as follows:—

Aldebaran	+ 0″·116 ± 0″·029	α Leonis	+ 0″·093 ± 0″·048
Capella	+ 0·107 ± 0·047	Arcturus	+ 0·018 ± 0·022
α Orionis	− 0·009 ± 0·049	α Lyræ	+ 0·034 ± 0·045
Procyon	+ 0·266 ± 0·047	α Aquilæ	+ 0·199 ± 0·047
Pollux	+ 0·068 ± 0·047	α Cygni	− 0·042 ± 0·047

The probable errors include an estimation of the probable systematic error of the measures, and are not as usual confined to the mere casual error of observation.

The results for Procyon and α Aquilæ are in close accord with those obtained by Auwers and Wagner for the first star, and by W. Struve for the second; and that for Aldebaran agrees with Prof. Asaph Hall's value; the value found by O. Struve—viz. + 0″·516—would appear, therefore, to be erroneous. But Dr. Elkin's parallax for α Lyræ is much smaller than the results which have been hitherto obtained by other observers, and which give in the mean a parallax quite five times as great as he has found. But the most remarkable result is that obtained for Arcturus, the practically insensible parallax of which seems in such strong contrast to its large proper motion. Dr. Elkin is well satisfied that the parallax of this star is extremely small, for his value depends upon eighty-nine observations and on five pairs of comparison stars, all in reasonable agreement.

The mean of the ten parallaxes gives for the mean parallax of a first magnitude star—

$$+\ 0''\cdot089 \pm 0''\cdot015,$$

a result according well with the values deduced by Gyldén (0″·084) and Peters (0″·102).